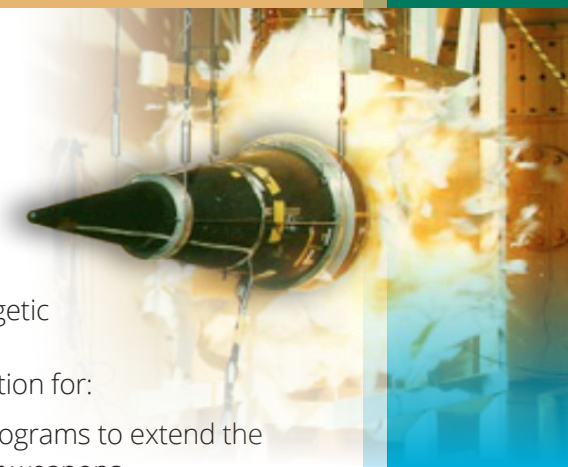


# The Explosive Technologies Group (ETG)

*Essential to every system in the U.S. Nuclear Deterrent*

The Explosive Technologies Group (ETG) is responsible for essential National Nuclear Security Administration (NNSA) and Department of Defense arming, fuzing, and firing functions for the U.S. Nuclear Deterrent (ND). Fuzing is a warfighter word meaning a component that determines the detonation point on a weapon's ballistic trajectory.

Sandia National Laboratories (Sandia) ETG ND mission is to provide:

- diverse technical expertise and an agile, integrated approach to solve complex challenges involving energetic materials for the nuclear deterrent (e.g., explosives, pyrotechnic compositions, and propellants) and
  - design for performance and safety
  - deliver high-quality, robust, and reliable components
  - perform critical assessments of energetic materials throughout their lifecycles
- state-of-the-art solutions for ND and other work within Sandia Strategic Partnership Projects (SPP).

The ETG has 30 energetic components in active development/production for:

- modernization programs to extend the life of U.S. nuclear weapons
- surveillance and maintenance of the current nuclear weapons stockpile
- testing to ensure safe and reliable component function throughout nuclear weapon lifecycles
- experimental science and technology.

NNSA estimates that over 60,000 diamond-quality-stamped components with Sandia-designed energetics must be delivered for stockpile insertion in the next decade. The ETG is the Design Agency and Production Agency for explosive components "when microseconds matter." The group has the production-mission assignment for all active and upcoming nuclear weapon systems requiring explosive components for subassemblies ranging from gas transfer systems and thermoelectric batteries to ferroelectric neutron generators.

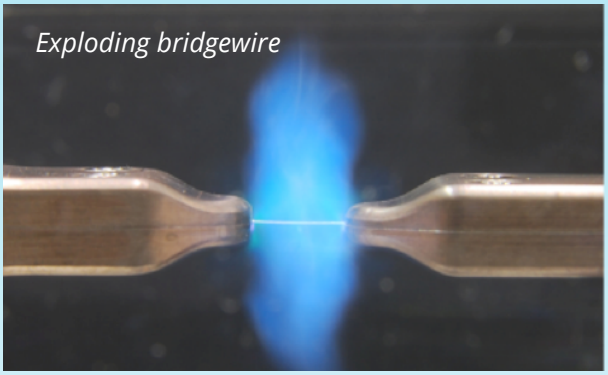
*Above: Light initiated high explosives*

*Electrostatic discharge testing*

The ETG is within Sandia's Component Science, Engineering & Production Center and includes six organizations with staff chemists, physicists, engineers, machinists, technologists, and those providing operational support.

The ETG's capabilities include optical diagnostics and test configurations to assess the behavior and performance of energetic materials; modeling and simulation tools to assess performance and safety; explosive components design, development, and prototyping; explosive materials testing and analysis; explosive detection; real-time chemical reaction kinetics; analytical techniques for characterizing energetic materials including gas, liquid, and ion chromatography; scanning electron microscopy; and ion mobility and mass spectroscopy. The Energetic Components Facility is a state-of-the-art explosives facility with the capability to detonate up to one kilogram of explosives indoors.

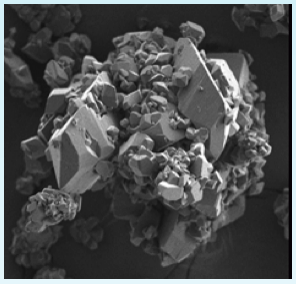
The sensitive, complex, and hazardous nature of the ETG's work is essential to Sandia's core ND mission.



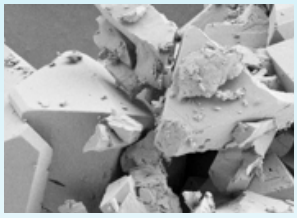
*Exploding bridgewire*

*Explosive machining*

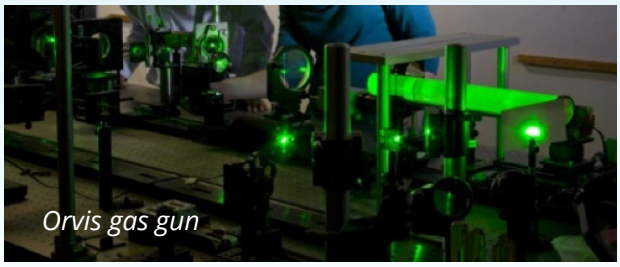
*Spin rocket motors*



*Scanning electron microscopy*



*Surveillance*



*Orvis gas gun*

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External Nov. 2020

Sandia National Laboratories

Sandia National Laboratories is a multimission laboratory managed and operated by National Technology and Engineering Solutions of Sandia, LLC., a wholly owned subsidiary of Honeywell International, Inc., for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-NA-0003525. SAND 2018-13696 O

U.S. DEPARTMENT OF ENERGY

NNSA National Nuclear Security Administration